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## The concept of energy justice across the disciplines

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# **The Concept of Energy Justice Across the Disciplines**

## **Abstract**

Over the last decade, ‘Energy Justice’ is a concept that has emerged in research across many disciplines. This research explores the role and value of the energy justice concept across the disciplines. It provides the first critical account of the emergence of the energy justice concept in both research and practice. A diagrammatical image for examining the energy justice concepts is presented and this is a tool for interdisciplinary engagement with the concept. In this context, restorative justice is introduced and how it results in energy justice applying in practice is detailed. Energy research scholarship at universities is assessed and it is clear that through universities there is a platform for energy justice scholarship to build on the interdisciplinary energy scholarship at universities. Further, the role of education is vital to policy-making, and the understanding and development of the energy justice concept. Finally, in analysing how the energy justice concept can impact on policy-making, there is a critical examination of the energy justice and its relationship with economics, and how it can transfer directly into practice by assisting in balancing the competing aims of the energy trilemma.

**Keywords:** energy justice; energy trilemma; energy justice concept; restorative justice; energy justice conceptual framework

## **Highlights**

Presents the value of the energy justice concept itself

Introduces restorative justice as having a key role across the energy justice concept

Expresses the need to develop a ‘common approach’ for the energy justice concept

Advances the conceptual framework for energy justice - from theory to practice

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## 1. Introduction

‘Energy Justice’ is a concept that is being used across many academic disciplines in energy research at the moment. This development has occurred over the last decade and is currently accelerating. One of the concept’s recent highlights has been its listing by the prestigious *Nature* journal series (Nature Energy) as a research topic covered by the journal.

There is one main research question that drives this paper and that is, what is the role of the ‘energy justice concept’ across the disciplines? In answering this question, there is a sub-set of questions and these include exploring how has the energy justice concept emerged, how will it continue its emergence, and how has it, and will it engage in practice and therefore become relevant to policy. This paper in essence examines the impact of the energy justice concept in academia, practice (i.e. the non-academic public and private sectors) and policy.

This paper contributes to the research literature in a number of ways. It offers the first historical overview of how the energy justice emerged. It also analyses energy research at university which demonstrates why ‘energy justice’ as a concept is likely to increase in its value to a range of disciplines across the sciences and social sciences at universities. Further, it will demonstrate a number of ways of how ‘energy justice’ is emerging in practice and how it can be adopted and utilized in policy (through restorative justice) and become economic policy relevant in the energy sector. Finally, this paper pioneers the exploration directly of a core concept that is emerging across all disciplines that conduct energy research and a concept that could be ‘ethos’ and provide

society's ethical framework for decision-making in the energy sector. In these ways this paper contributes to this special edition on 'Exploring the Energy Justice Nexus' in the following ways in terms of advancing the literature (and which are explored in more detail in the later sections) (Jenkins *et al.*, 2017): (1) provides a critical theoretical explorations of energy justice frameworks; (4) exploration of energy justice's role as a decision-support tool for policy-makers; and (5) presents understandings of energy justice across multiple scales; considering the heterogeneous ways in which energy justice might be negotiated and implemented.

The paper begins in section two by providing a critical account of the emergence of the energy justice concept. This involved the identification of three specific stages in its development and how these have influenced the development of the energy justice concept. It discusses the reasoning for why there is a need and an opportunity to work on building further the energy justice concept and having a common concept across the disciplines. It presents a diagrammatical representation of energy justice for researchers and policy-makers to interact with. Finally, restorative justice is advanced as a way of ensuring energy justice is applied in policy. Three recent examples demonstrate this: (1) Environmental Impact Assessments and the post-acceptance monitoring phase; (2) a Social-License-to-Operate that will ensure develop cooperation with the local community over the life-span of the energy infrastructure; and (3) the Energy Financial Reserve Obligation where the company needs to demonstrate they have the financial capacity to clean and restore the mine.

Section 3 details the importance and role of energy research at universities and how this provides the support for more integrative research on energy and that energy justice

scholars are ideally placed to take advantage of this given what the concept brings to energy research through its focus on ‘just’ decision-making in the energy sector. It highlights the importance of education in ensuring that the energy justice concept is utilised in research and education and there then is a knowledge transfer to policymakers. The second half of the section highlights a pitfall for energy justice and that is due to the lessons learned from how the environmental and climate justice concepts developed.

Section four presents an account of energy justice research crossing into policy-making, in essence going from theory to practice. It highlights the importance of ensuring energy justice impacts upon economic policy and how this might be achieved and the potential success it can deliver. It emphasises the importance of understanding the concept and also provides a detailed analysis of how economics engages with justice issues before demonstrating how energy justice can resolve the economic problem of balancing the competing aims of the energy trilemma.

## **2. A Critical Account of the Emergence of the Energy Justice Concept**

This exploration of the emergence of the energy justice concept in both academic and practice is the first in the literature. Exploring when and how it emerged in use is necessary in order to understand: (1) its potential application in practice and policy development; and (2) its potential longevity, value and impact in energy research. This sections aims to provide a critical theoretical exploration of energy justice as a concept

and its frameworks – similar to one of the challenges identified for this special issue (Jenkins *et al.*, 2017).

There is little in the literature that details the emergence of the concept of energy justice. Even in the two early monographs which both aim to explore energy justice in detail they do not reference its' beginning (Sovacool and Dworkin 2014; Guruswamy, 2016). Further, in a first review of the concept entitled '*Energy justice: a conceptual review*', the authors do not review the origin of the energy justice concept itself, they conduct an academic literature review of its development in academic research and with little mention of its use in practice (Jenkins *et al.*, 2016).

This paper highlights and advances that there are three specific phases of research that mark the beginning of energy justice research and practice and these are outlined below in the proceeding paragraphs. The first is its use in practice, and in particular, by NGOs. The second is its early use in academia and this is notable in that the concept of energy justice was not advanced or examined by the literature. The final, third phase, is where energy justice is defined as a concept and the research literature builds upon these concepts.

### ***(1) Its use in practice***

Energy justice is a term that has been used in practice (i.e. in non-academic life, such as in the commercial and public sectors) far longer than in research, albeit to a very limited degree. There are two NGO's that have used the term pre-dating academia –

one in the US (since 1999)<sup>1</sup> and in the UK<sup>2</sup> (at the very least in 2009 or before). There is another later reference to its use in 2011 by the Chief Executive of National Energy Action (UK) who referred to it in the context of the UK energy sector only and which is a charity whose focus is on ending fuel poverty (Saunders, 2011).

## **(2) *Its early use in academia***

The term energy justice was first used in academic research literature in 2010 in an article entitled *Energy justice and sustainable development*, however, the article is more on sustainable development than energy justice (Guruswamy, 2010). Indeed, apart from at the beginning when energy justice is defined essentially as energy poverty there is little further mention of it, and it receives little attention in the conclusion where it is clear sustainable development is the focus of the article. This is similar to an article in 2013 entitled '*Energy justice and ethical consumption: comparison, synthesis and lesson drawing*' which is about ethical consumption in the energy sector and does not address the energy justice concept itself - nor however does the author claim too and in addition, the author states there is no definition of what it means (Hall, 2013). Then there was a book entitled '*Energy Justice in a changing climate*' published in late 2013 however, the emphasis was not on exploring the energy justice concept itself but in relating the term to other issues in relation to climate change – which is a rather limited perspective since the concept or what it means is never fully debated (Bickerstaff *et al.*, 2013).

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<sup>1</sup> Energy Justice Network (US). 2016. Available at: <http://www.energyjustice.net/about> (last accessed 20 October 2016). And see more concerning its accomplishments, available at: <http://www.energyjustice.net/accomplishments> (last accessed 30 October 2016).

<sup>2</sup> Centre for Sustainable Energy (UK). 2016. available at: <https://www.cse.org.uk/contact> (last accessed 30 October 2016).

### **(3) *Its use in academia when a defined concept***

It was in early 2013 when the term ‘energy justice’ began to receive more attention in the literature and become the object of study. This is when scholars started to define it as a concept and develop frameworks. In an article in early 2013 energy justice was defined as having three central tenets (McCauley *et al.*, 2013). This was followed by an article exploring specifically, energy justice across the energy life-cycle or system in early January 2014 (Heffron and McCauley, 2014). Thereafter the literature on energy justice as a concept has increased and there now is a seminal article in *Nature Energy* (Sovacool *et al.*, 2016) and even a review paper (Jenkins *et al.*, 2016).

In terms of defining the concept there are two main definitions. There is the first from 2013 that defined energy justice as having three central tenets (McCauley *et al.*, 2013) and what was referred to as a *triumvirate of tenets* – distribution, procedural and recognition justice (or sometimes as referred to as justice as recognition) which were applied throughout the energy system (Heffron and McCauley, 2014). Second, a principled approach to energy justice was advanced that is based on eight core principles from 2014 and which has been worked on since (Sovacool *et al.*, 2016) and these include: availability, affordability, due process, transparency and accountability, sustainability, intra-generational equity, inter-generational equity, and responsibility. These are the two frameworks for thinking on energy justice and defining it as a concept. There has been one addition which has been to consider energy justice within an energy system (i.e. the application of energy justice at each activity in the energy life-cycle) (Heffron and McCauley, 2014, and subsequently in Jenkins *et al.*, 2014). These defined concepts of energy justice compete with each other and at the same time complement each other - as will be demonstrated later in this section .



It is not the aim of this paper to critically assess these frameworks but in terms of assessing their value to different disciplines and exploring their merit, this section of this article is aiming to be critical of how scholarship has engaged with them and how these concepts have engaged with policy. Through this critical assessment, preliminary assumptions can be established in terms of the energy justice concept and its potential future longevity, value and impact in energy research and consequently, in policy.

A major limitation of the approaches outlined above - the triumvirate of tenets, energy life-cycle (systems) approach and the principle-based approach – is that there is little reflection of how these transfer into practice and are ‘enforced’ in practice, i.e. energy justice becomes a delivered outcome through policy. Few scholars (as outlined above) have even referred to the use of energy justice in practice, despite it having a longer history of use than in academia.

In exploring how energy justice can become a delivered policy outcome, i.e. making that link between academia and practice, Figure 1 below, represents the energy justice conceptual framework based on the main literature to-date that focuses directly on analysing the concept. While there has been engagement with it already, more is needed, and the energy justice scholarship community in this context needs to take note of Popper’s (1963) and Kuhn’s (1962) arguments in developing a knowledge base – i.e. a research community builds layers of understanding from a common base. For example, the discipline of economics is just one example where thinking and modeling techniques from neo-classical economists have gained prominence while econometrics, and behavioural economics have also risen in importance of late. They did this through

building on the core models and concepts, and by collaboration, not by significant lone research and continuous additions to the concept rather than challenging the core assumptions itself – albeit they did not engage in sufficient critical reflection. Similarly this is how other disciplines have developed over time and one can note both Popper's (1963: 2002) and Kuhn's (1962) arguments (despite them having differing views on the process of development) here where they discuss the journey of the development of scientific knowledge. More will be discussed on the merit of working together and interdisciplinary research in the next section.

Insert Figure 1

In looking at the energy justice conceptual framework, one begins with looking at the core tenets of the energy justice to see if they are present before then broadening their scope to see where the issue fits within the energy life-cycle (or energy system) in the context of having a world-view, i.e. a cosmopolitan perspective. Then they look at how to apply energy justice in practice and look for how the problem, issue and/or challenge they are researching can be addressed (or not) by the principles.

### ***Energy Justice – From Theory to Practice: Restorative Justice***

Figure 1 (above) identifies three clear phases of decision-making for applying energy justice from theory to practice. The addition this article makes to the literature is that at each phase 'Restorative Justice' is applied. The application of restorative justice at each phase aims to ensure energy justice is applied in practice. The question arises how does restorative justice achieve this? Restorative justice is primarily used in and emerged

from criminal law and is explored in more detail in this section – and will deserve greater attention in future research. Restorative justice provides a uniting goal or aim of the energy justice concept that all researchers can engage it despite their disciplinary focus.

Restorative justice arose from society questioning after an injustice has occurred what has been the response to the victim. Restorative justice aims to repair the harm done to people (and/or society/nature), rather than solely focus on punishing the offender – as societies use the legal system for. Further, restorative justice can assist in pinpointing where prevention needs to occur. While the application of restorative justice is a long-standing debate with the literature in the area dating since the 1990s (Galaway and Hudson, 1996), recent international events (i.e. such as the global financial crisis 2007-2009 and the September 11 attacks in the US (Zehr, 2014)) have prompted society to further explore and apply this type of justice more in decision-making, policy-making and subsequently then into law, and then resulting in delivered outcomes (should the legal system be robust on enforcement).

Restorative justice makes society think about how to respond to injustices (harms) that have occurred and also in defining what injustices society should give attention to in the first place (Sullivan and Tifft, 2006). While it has been applied mainly in relation to criminal law, one of the areas it has been applied is in corporate crime (Wietekamp and Kerner, 2002; 2011). In the context of the energy sector, this is significant, as one can immediately think to its application post energy accidents for example where it is clear the energy company is responsible for the accident, i.e. the US BP Deepwater Horizon accident.

The application of restorative justice when applying energy justice decision-making forces decision-makers to engage with justice concerns and consider the full range of issues, as any injustice caused by an energy activity would have to be rectified. In some cases, these costs of ‘restoration’ would be prohibitive and consequently that energy activity would cease or not be proposed. It would ensure that the three energy justice approaches of three tenets, the energy system and/or the eight principles are applied as these identify the areas where restorative action would have to be applied . Then they will all assist in determining a restorative ‘cost’ of the proposed action which can feed directly into policy decision-making.

Hence, if restorative justice were applied to the energy sector it would ensure that decision-making was made in light of considering the potential harm of that decision and consequently the true cost of that decision. In some cases this is already the case in the energy sector but the terminology of ‘restorative justice’ is not used. There are examples of this below in practice in three recent phenomena in the energy sector that are having a big impact on the energy sector. It is clear from these examples discussed in brief below that restorative justice provides closure to the energy decision-making process, it forces the policy-maker to think about what the final outcome will be, and how will policy ensure this. This is evident in relation to practice in three recent phenomena in the energy sector outline (below): (1) Environmental Impact Assessments and the post-acceptance monitoring phase; (2) a Social-License-to-Operate that will ensure develop cooperation with the local community over the life-span of the energy infrastructure; and (3) the Energy Financial Reserve Obligation

where the company needs to demonstrate they have the financial capacity to clean and restore energy infrastructure at the end of its lifespan.

#### ***(A) Environmental Impact Assessments (EIAs)***

The aim of an Environmental Impact Assessment (EIA) is for international, national and local communities to achieve a balance between development and the environment. There are many other methods and strategies for balancing development and the environment but an EIA is a formalised process that has had international and national consensus on its development over time. This article does not aim to go into particular depth on EIAs but briefly the EIA process has placed certain limitations on development and ensured that development that does occur is achieved with environmental protection as a core aim from the beginning of the process (Tromans, 2012). Already at international level the EIA is promoted for use in nearly all projects funded by international development agencies – such as the World Bank, the OECD, and the UNEP. This area of law is still developing fast and is set for further reform later in the EU in 2017 (and probably internationally afterwards) with the intention that it will become more inter-related to climate change. Significantly, as is not the case at the moment, reform measures include more of a requirement that there will be monitoring of the energy infrastructure project once it has received its EIA approval to ensure that the project developer has met their environmental obligations once the project is built.

#### ***(B) Social Licence to Operate (SLO)***

The Social-Licence-to-Operate (SLO) is a fast emerging principle in energy law and is, in particular, developed around the mining law and policy community.<sup>3</sup> However, it is permeating through the rest of the energy sector and even to other parts of the economy. There are a number of papers which explore the origin of the SLO and its use in the mining sector and it is likely that in the future the vast majority of the energy infrastructure will need an SLO before beginning operation (Prno and Slocombe, 2012; and Morrison, 2014). The SLO in essence builds on an EIA and ensures the energy project operator works with the local community for the lifespan of the project rather than as was previously the case, just satisfying the local community at the outset of the project.

### ***(C) Energy Financial Reserve Obligation (EFRO)***

Energy Financial Reserve Obligation (EFRO) is a general term for the obligation that companies should have when operating energy infrastructure. In particular, the EFRO applies in terms of companies with waste obligations – or indeed the companies that should have waste obligations. These can also be referred to as clean-up obligations and environmental bonds, and the nuclear energy industry contributes to waste management funds immediately from the point of operation whereas in the coal industry, the operator only has to have the financial reserve capacity to do so (Dondo, 2014). Indeed this has become a major issue and there is a multitude of reports focusing on it in relation to the operation of coal assets in Australia and US (see Gallucci, 2016; Robertson, 2016; Miller, 2005). For example, in the US, under the Federal Surface Mining Control and Reclamation Act (SMCRA) 1997 (and in Australia it's the Financial

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<sup>3</sup> For more see: On Common Ground Consultants Inc. 2014. What is the Social License? Available at: <http://sociallicense.com/definition.html> (last accessed January 2017).

Assurance under the Environmental Protection Act 1994.), energy companies are required to remediate the lands where mining activity has occurred. However, many companies were allowed to self-bond and therefore when they went bankrupt there was still no finance available for meeting reclamation obligations (Bloomberg, 2015; ABC Australia, 2015) and the EFRO counters this corporate behaviour.

### ***Restorative Justice applied across the Commercial Energy Project***

From these three examples, it is demonstrated (and see below in Figure 2) how restorative justice applies across an energy project and ensures that the local population, society and nature is not subject to harmful actions. In looking at the value of restorative justice across an energy project, it is evident therefore that there is value to ensure those disciplines involved at the different stages of an energy project have the necessary exposure and education on energy justice – and this is explored in the next section.

Insert Figure 2

### **3. From Energy Education to Energy Policy-Making**

One of the main reasons why energy justice has a significant opportunity as a concept to impact upon the energy research and practice is because of the sustained development of energy research at universities. In examining energy research at third level education, one can highlight the potential longevity, value and impact in energy research that energy justice has the potential to have. In this section the study of energy

research is examined and it is demonstrated how ‘energy research’ has become ingrained at universities and institutes of technology. Consequently, this presents an opportunity for the ‘energy justice concept’ that crosses the disciplines to make a significant impact at third level. In terms of advancing the literature in relation to energy justice as key for this special issue (Jenkins *et al.*, 2017), this section aims to contribute to explorations of energy justice’s role as a decision-support tool for policy-makers. In ensuring that future energy decision-makers (inc. policy-makers) who become stakeholders in the energy sector acquire knowledge on ‘energy justice’, universities play one of the most important roles in ensuring that this happens. This section examines energy research at universities and also identifies some possible pitfalls of the for energy justice scholars may face in the future.

The growing community of energy justice scholars need to ensure that the energy justice concept has internal aims within academia (constant normative and evidence-based evolution of the concept) and external aims beyond academia, i.e. where decision-making and policy formulation in the energy sector is made with energy justice ‘thinking’. These internal and external aims need to be developed from a solid base of literature which can also be utilised in the practice of teaching on energy justice.

Energy research is growing across universities. It is evident that energy is truly one of the only areas of research that remains today as transcending across all disciplines. This is supported by energy being one of the only areas of research that is supported across and by the university with cross-university energy research centres or initiatives being supported at 16 of the Top-20 universities in the world - if one uses the Times Higher Education rankings (Times Higher Education, 2016) - see Table 1 below.



## **Insert Table 1**

In addition, in many universities there is even a further focus on good energy practices through a variety of activities and these come in many forms. For example, the most notable is that there is a Green Metric Ranking of world universities and interestingly nearly all the top-20 universities on this list all produce more than 100 *per cent* of their own energy needs (UI Green Metric Ranking of World Universities, 2016). This latter development is increasing with universities worldwide seeking to build their own energy generating resources.

Significantly, the role of universities in education on energy issues (though it refers to sustainable development) is highlighted in Ch. 36 (promoting Education, Public Awareness and Training) of Agenda 21, the Action Plan of the 1992 United Nations Conference on Environment and Development. In academic literature, it is clear that universities have a role in energy education and the focus is mainly on skills development as well as job potential for those who study in this area (Duke *et al.*, 2013). In the context of energy justice, it is notable that some universities have been recruiting specifically for energy justice scholars to academic posts (University of Sussex, UK, and Michigan Technological University, US) while others have courses on energy justice (University of Minnesota).

However, even more education is needed on energy and sustainability issues to reduce the impact of the energy sector on the environment. For too long, this has been avoided. In many ways and echoing David Orr's words it is now time for those people with BAs, BSs, LLBs, MBAs and PhDs to correct the wrongs they inflicted on the planet and to

educate us on how to improve our use of energy resources (Orr, 1994) – i.e. it is time people begin to transfer their education into policy-making on energy issues. In this context, there is a lack of leadership in the area of energy education (Martin and Jucker, 2005) and there are calls for energy scholars and educators to extend their roles beyond that of just education and on to college and university committees (Martin and Samuels, 2012). The latter view is particularly interesting in the context of the earlier mentioned example of universities developing their own energy resources. Hence, there is the possibility for energy researchers to apply their research into practice not to mention contributing to policies concerning energy investments in terms of the university endowment.

Energy research has clearly developed at universities however there needs to be more interdisciplinary research. There is a need for more integration of ideas with most research ending up not being interdisciplinary but multi- and trans-disciplinary and indeed Becker *et al.* (1997) argue that *‘attempts to cope with the complexity of issues raised by sustainability cannot simply aim at adding some new pieces to an already existing knowledge base’* but rather there needs to be a *‘paradigm shift towards a new knowledge base’* characterized by *‘practices of integration’* (Becker et al., 1997: 37 – in Jones *et al.*, 2010). And this is where energy justice as a concept and the energy justice research community has an advantage, it has an interdisciplinary aim and a focus on a theme that encourages and already has encouraged practices of integration. Educating the next generation of energy students with a defined interdisciplinary concept of energy justice will ensure to some degree energy justice scholarship will impact upon policy-making in the future. A further discussion on interdisciplinary education is in Section four.

### *Pitfalls for the Energy Justice Concept*

In looking at the current prominence of energy research at universities it is important to consider the previous prominent incumbents at one time. Individually and jointly, environmental and climate change university-wide centres were supported but these seem to have decreased and/or disappeared over the last two decades.<sup>4</sup> For all the positives of environmental and climate change movements – and there are many – its effectiveness of two concepts - climate justice and environmental justice - has to be called into question. That is not to say that both climate justice and environmental justice have not achieved success. They have. But despite their successes, the world is still producing more carbon dioxide emissions than ever before.

According to many reports by leading researchers, academics and international institutions it is not about whether society is staying within a 1.5°C or 2°C rise in temperature but 4°C degrees. Indeed recent reports highlight that seven climate records have been broken this year: melting of Arctic ice; consecutive hottest months; hottest day in India ever; highest temperature in Alaska; consecutive and biggest annual increase in CO<sub>2</sub>; hottest Autumn in Australia ever; and highest amount of destruction in Australia's Great Barrier Reef ever (Vaughan, 2016). What is striking about this list, is that the effects of climate change are being experienced across the world. This is not to mention the increase in extreme weather events (a feature of climate change) being experienced across the world also. These latter issues are just a selection of issues that

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<sup>4</sup> This is revealed by checking the same universities as those in Section 3 in Table 1 conducted by the authors.

could be listed but they highlight nevertheless that society's laws (if present in some cases) and therefore the application of justice in environmental and climate change decision-making are not being effective.

Hence, in reality, a revision of what has been achieved by climate justice and environmental justice is needed. Questions need to be asked about whether they have: (1) just slowed down or stopped previous excess energy, environment and climate change injustices; or (2) have they been more focused on mitigation initiatives; or (3) have they been putting the building blocks in place for more concerted global efforts on these issues – and from which energy justice can take advantage of.

While it is not the aim of this paper to delve into these questions - though, it must be noted they are worthy of further exploration on their own and they form part of a future research project that develops from this paper – one can consider briefly the aims of environmental and climate justice detailed. Environmental justice began really in the late 1970s and has had three main features: (1) how individual action can contribute to the environmental movement; (2) ensure environmental risks are distributed equally; and (3) promote alternatives that reduce greenhouse gas emissions and assist communities affected by climate change (Mickleson, 2007). Climate justice scholarship began in the 1990s and its theories and concepts primarily has a focus also on assisting those affected by climate change, sharing the burdens and benefits of climate change, mitigation and adaptation and also reducing the main cause of climate change, CO<sub>2</sub> emissions (for more see, Lyster, 2015). Considering the sustained increase in carbon emissions, it is clear that environmental and climate change justice have had a limited impact in terms of decreasing emissions of CO<sub>2</sub>.

It is evident from the above and also the aim of environmental and climate change law where the focus is more on ‘preventative action or mitigation’ – i.e. note environmental justice is not about the elimination of environmental risks but distribution of them. Further, the definitions of both environmental justice and climate justice have been diffused over time and their value has not transferred consistently in interpretation across the disciplines. This is in part due to environmental and climate change scholarship decreasing at universities with interdisciplinary centres not establishing themselves across universities. This has contributed to a lack of opportunity and/or motivation to work with others beyond your discipline and have a concept that crosses all disciplines. It is advanced here that too much lone scholarship and narrative-building exercises on environmental and climate change justice has occurred where additions were made to concepts before the concepts themselves were assessed for the merit, values and potential for impact.<sup>5</sup> Too many researchers have been happy to fit their research into the label of environmental or climate justice rather than engage directly with the environmental and climate justice scholarship, and significantly then to translate it into policy action – as this overall special issue aims to explore (see Jenkins *et al.*, 2017). This is an area where energy justice scholarship can learn and ensure that it crosses into policy – and as stated in section two there needs to be clarity on the concept in order to ensure its engagement with policy.

In the context of energy justice scholarship developing in a similar way, one can use Ludvig Wiggstein’s concept of ‘family resemblances’ here where some phenomena

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<sup>5</sup> Indeed, this is in part what happened to neo-classical economic thinking which rather than been challenged and evaluated itself, too many economic researchers utilised and added to it, and as a result of an unchecked, or unquestioned or unevaluated ‘core’ it contributed in time to the financial crisis of 2007-2009.

seem related because they have a range of ‘overlapping and crisscrossing’ similarities rather than because they have specifically unique characteristics in common (Wiggenstein, 1958: in Susskind & Susskind 2016). Hence, what is and what is not energy justice scholarship is important to determine, and those engaged in energy justice scholarship need to build outward from what the concept is and what it means to their research. Energy justice has the opportunity to avoid these latter pitfalls of environmental and climate justice scholarship and build a more solid and lasting foundation to its core meaning and value, in essence, transfer the energy justice concept from education and into practice.

#### **4. A Critical Account of Energy Justice Research: From Theory to Practice**

Echoing the movement at university level is the prominence in society of energy issues. This is in part prompted by the major issue that on average near eight *per cent* of the world's global GDP is energy related – the only comparable sector in terms of such a high percentage is health (which is generally one-to-two *per cent* more) (IER, 2010). Further, the energy sector impinges upon the day-to-day lives of all populations as will be outlined below, and energy injustices more than often result in the abuse of human rights at some level. The importance of an energy justice concept is its use as a tool that can help ensure research and practice in the energy sector is developed through decision-making that is more just and fair, and hence can contribute to restoring increased equality in society.

In examining the immediate causes of climate change one can look at Table 2 below. The emissions and damage caused by many of the economic sectors are difficult to change but in terms of the energy sector these are more readily potentially easy to change. Indeed, the energy sector in effect accounts for 41 *per cent*. And in many ways energy research can significantly impact upon reducing the effect of this 41 *per cent* on society. For example, this is because it is easier to quantify where the damage/pollution is coming from, who is the emitter and in general, these emitters/polluters are significant sources of pollution and emissions.

## **Insert Table 2**

Recent success can be seen in the increased scope for international cooperation in the form of the signing into force of the Paris COP21 agreement (4 November 2016), 2016),

the recent announcement of the Antarctica region being a protected area (CCAMLR, 2016) and the shipping industry's initiative to cap sulphur emissions (IMO, 2016). Could such a similar agreement be reached for the Arctic and therefore this may signal an end to the speculation of exploration by oil and gas companies? Can energy justice play a role here? Indeed, it will not do so if there is no uniformity over it as a concept.

Indeed, there is hope for change when one considers that just 90 companies are responsible for two thirds of the world's CO<sub>2</sub> emissions (Heede, 2014). This as suggested earlier, is why the energy sector may be more easy to change. The energy research community has only to work with these 90 companies and target and/or influence their behaviour to ensure global change and increase the justice in energy decision-making.

Energy justice needs to be more targeted as stated and have a more direct link with policy. In thinking critically there is little in the literature that has provided examples of successful engagement, to-date, the success of the 'energy justice concept' is in research. There needs to be a realisation within some of the energy justice research community that there needs to be work completed connecting it to 'cost' and economics. Policy formulation in the energy sector is dominated by economists and industry where economic costing is the prime tool used for decision-making. To some degree environmental and climate justice as concepts have been naïve in their approach. It was built on a presupposition that society would support their 'ideal'. This ignored the data-driven world of policy formulation and the dominant role that economists and economic-modeling have in this regard. For example, consider the following comment from a former economist in the mining sector (and author of a mining economics



textbook) where the: “Mining is first, and foremost, an economic activity. As in any other economic sector, mining companies are in business to earn profits, and that is their basic justification and objective.... In recent years it has become fashionable to talk of a ‘triple bottom line’... meaning that companies have to meet social and environmental objectives as well as financial ones... There can only be one ‘bottom line’, which is profitability, and to pretend otherwise is essentially self-deluding” (Crowson, 2008: 405).

One of major international and influential economic institutions in the energy sector is the World Energy Council (2016) and to-date there has been limited interaction with them by the energy justice research community. Further, there has been limited critical analysis of the output and agenda of the World Energy Council. This section of this paper addresses one of challenges outlined for this special edition and critically explores of energy justice’s role as a decision-support tool for policy-makers. In terms of energy justice research producing more data, there are examples (such as Heffron *et al.*, 2015) but this is also recognized as an issue and challenge for energy justice by (Jenkins *et al.*, 2017).

### ***Understanding Concepts***

Energy research is a complex topic and moves from its impact on our own lives in terms of our bodies needing energy to survive to nearly every activity we do now involving energy from many daily activities of our everyday lives. In examining energy across the disciplines there are many models, concepts and theories, such as energy being fundamental to life (Heffron J, 2016), to Krebs cycle, to Newton’s laws of motion, to

more recently, the evolution of energy law (Heffron and Talus, 2016), the new energy paradigm (Helm, 2007) and the energy trilemma (WEC, 2016a). Further, in order to increase understanding due to its complexity, the World Energy Council (WEC) has recently referred to its three scenarios for the future development of the energy sector as (numbers and underlining added by author for clarity and emphasis):

“(1) Modern Jazz, which represents a ‘digitally disrupted,’ innovative, and market-driven world, (2) Unfinished Symphony, a world in which more ‘intelligent’ and sustainable economic growth models emerge as the world drives to a low carbon future, and a more fragmented scenario called (3) Hard Rock, which explores the consequences of weaker and unsustainable economic growth with inward-looking policies (WEC, 2016b).”

The new drive to understand energy from multiple perspectives has resulted in many journals on energy research across the disciplines and indeed the foremost international academic journals regularly report and have research articles on energy research, such as *Nature*, *Science* and even the *National Geographic*. Further *Nature* has developed its own specific *Nature Energy* journal that followed the earlier production of *Nature Climate Change*.

Increasingly, more and more energy journals are accepting work from across the disciplines. Indeed one such study (Sovacool, 2014) found that there was an underrepresentation of social science research (except for economics) in the literature, however, this is slowly improving, and increasingly so in the leading energy journals – such as *Energy Policy*, *Applied Energy* and *Energy* – are accepting research from across

the full range of disciplines. Further, a new more dedicated journal has begun in *Energy Research and Social Science* – though this journal also accepts all types of research. Nevertheless, in the context of energy justice it is significant in that it is one of 22 named research areas which *Nature Energy*<sup>6</sup> suggest that it will accept article submissions on – and *Energy Policy* is having this special issue on the topic of energy justice and also *Applied Energy* has a forthcoming special issue. Universities have also begun to hire researchers and offer modules on energy justice as noted earlier in section three.

Increasingly there is more published energy research that is interdisciplinary and that is inevitable in part with universities encouraging energy researchers and providing the platform to do so – as suggested in the section three. However, there could be an argument is this work always good? Does interdisciplinary work always result in good research and is it an improvement on previous work in the area? This issue deserves further research, however, this paper advances the view of Sir Hans Krebs – who received a Nobel Prize in 1953 for Physiology or Medicine and is renowned for the Krebs Cycle, a representation of energy production in the body – that working together in groups improves research over time (Krebs, 1967). This is a lesson for energy justice scholars. It is not to dismiss the work of lone researchers, but more to highlight that universities (as outline in section 4) provide an interdisciplinary platform for energy scholarship, and energy justice scholars can take advantage of this.

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<sup>6</sup> Nature Energy. 2016. Aims and Scope. Available at: <http://www.nature.com/nenergy/about/aims> last accessed 30 October 2016.

Encouragingly, one of the features of energy justice scholarship at the moment is that it is evident that scholars are working with other disciplines and forming and publishing from interdisciplinary projects. More of this type of research needs to be conducted and more researchers need to reach out beyond their disciplines and engage. While trans- and multi- disciplinary work has its merits, interdisciplinary work will have more impact – and this has been noted in particular in relation to energy and climate change research (Ledford, 2015; Bromham *et al.*, 2016), and throughout a special issue by Nature on *Interdisciplinarity*.<sup>7</sup>

### ***Energy Justice and the (Economic) Policy Perspective***

Indeed one example of this is the work on energy economics which perhaps for too long has focused on delivering low-cost and/or efficient outcomes. What has this resulted in? It can be argued and will be in future research (by the authors) that the majority of economic-led energy research has led to the retention of the *status quo* in the energy system. Focusing on low-cost and/or efficient outcomes has led to a continued reliance on the use of fossil fuels in the short-term and as a result building low-carbon energy infrastructure or developing a low-carbon economy has been a secondary concern for energy policy.

This point can be illustrated by the World Energy Council (WEC) who advanced the notion of the ‘energy trilemma’ (as mentioned earlier). The challenge of the energy trilemma is to balance three competing aims which are energy security, environmental

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<sup>7</sup> It should be noted that this was even the topic of a special issue of Nature – Available at: <http://www.nature.com/news/interdisciplinarity-1.18295> last accessed 30 January 2017.

sustainability and energy equity (affordability and accessibility) – which can be represented in Figure 3 below.

### **Insert Figure 3**

The WEC is an economics-led institution that has placed ‘affordability’ as one of the three competing aims of the energy trilemma which results in society aiming to provide low-cost energy. However, a focus on low-cost energy will mean the continued use and development of fossil fuels, and in essence a retention of the *status quo* of the energy sector. Fossil fuels remain cheap energy sources because they do not pay for externalities such as the long-term storage of their waste product CO<sub>2</sub>, the damage already incurred because of CO<sub>2</sub>, other wastes such as SO<sub>2</sub>, and they also receive some of the highest subsidies globally – far more than low-carbon energy resources (IEA *et al.*, 2010; GSI, 2010).

Hence, an institution, such as the WEC should just list the word ‘economics’ as one of three aims rather than just affordability (and accessibility) as then the aim would be to look at a more broad range of ‘economic’ issues. A more just and reasonable focus for energy decision-making (i.e. on balancing the energy trilemma) would include other economic concerns such as: energy finance (project finance); energy prices (i.e. oil and gas); electricity prices; insurance costs; subsidy support (in all its forms); tax incentives; and affordability.

To understand with more clarity why the WEC has a narrow view on the economics and the resulting effect, it is necessary to view the origin of the use of the energy

trilemma and the WEC. The first time the WEC used the word ‘trilemma’ was in 2011 and not from 2005 when they produced their first reports. The economics angle of the ‘energy trilemma’ was discussed as ‘social equity’ at first which in 2011 included ‘affordability’ and ‘accessibility’.<sup>8</sup> This has evolved since to 2016 where it is now ‘energy equity’ and the goal of the energy trilemma index produced is that it, the *‘Energy Trilemma Index quantifies the energy trilemma and comparatively ranks 125 countries in terms of their ability to provide a secure, affordable, and environmentally sustainable energy system (WEC, 2016a: 6).’* Again, the use of the word ‘affordable’ (which is singled out over accessibility) is arguably wrong, and means their view of ‘energy equity’ is in reality about affordability. Such a focus on affordability will retain the *status quo* of the energy sector, and encourage low-cost energy solutions which centre on fossil fuels which as stated earlier do not pay anything for their long-term waste storage. The WEC should be using other mechanisms to think about the ‘economics’ of the energy sector as there are far more energy economic concerns than just affordability. The creation and support of short-term policies that are not sustainable and that contribute to energy injustices but deliver better prices should be sacrificed for medium to longer term sustainable and energy just policies.

In the future, energy decisions and models such as these need justice at the core – a more balanced energy trilemma can be represented in Figure 4. If one takes it literally the WEC is actually stating that we should have a trade-off with ‘equity’ (which to the WEC means affordability and which is their only reference to some form of ‘justice’ in the energy sector – with energy security and the environment. This thankfully does not

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<sup>8</sup> This focus on affordability’ and ‘accessibility’ is same economic bias that makes us focus on increasing economic welfare through competition and gains in efficiency which will result in lower prices which can be passed on to consumers – whether this fully works in the energy sector is open to question and generally energy markets need state intervention to ensure fairer, or more just outcomes.

represent the view of many researchers who now see ‘energy justice’ at the core of decision-making in the energy sector. Further and significantly, perhaps the WEC needs to revise its own thinking in light of their recent report stating they are in search of how to ‘balance’ the energy trilemma (WEC, 2015). Is the ‘balancing factor’ not ensuring justice in energy decision-making, i.e. delivering a *just and equitable* way to manage the competing aims of the energy trilemma. ‘Equity’ as the WEC define (i.e. they define it as affordability) is not ‘justice’ in the energy sector. The energy sector is more than about energy or electricity prices and consumption by consumers.

**Insert Figure 4**

## **5. Conclusions & Policy Recommendations**

Energy justice scholarship is developing at a fast pace and already it has had some notable successes as outlined in section two and three. There is a great third level education basis for research and education that can have a direct impact upon the energy sector and therefore influence the future energy mix used by the human population and contribute to a more sustainable economy where environment and climate change mitigation are key policies.

This article has three specific policy relevant contributions and these are in particular in the context of (1) critically exploring the theoretical explorations of energy justice frameworks, and therefore building on this by (2) analysing through education (as applied to third-level education) energy justice’s role as a decision-support tool for policy-makers, and (3) considering the ways in which energy justice might be

negotiated and implemented in relation to economic policy-making.

### (1) Critical Account of the 'Energy Justice Concept'

The critical account of the energy justice concept builds evidence for policy-makers to justify its use. It is the first article to account for its beginning in both practice and research. Further, it is the first in the literature to engage critically with economists – who drive policy outcomes – and therefore demonstrates that energy justice scholars need to improve their message (if they are to be serious about policy engagement) and an interdisciplinary concept will enable this. In order to achieve this, this article provides a diagrammatic structure to the energy justice concept. Further, it adds the dimension of restorative justice which is common to society in its use in criminal law and could have a significant impact in the energy sector.

### (2) Energy Justice Education

Policy-makers and educators need to ensure energy justice is part of the energy curricula. Education and research at third-level education needs to improve and needs to be developed in an interdisciplinary way. Already energy research is supported by a sustained platform for energy research scholarship at universities and energy justice scholars should build on that potential. Interdisciplinarity is particularly effective for energy and climate change research and ensuring energy justice is at the core of energy research will result in the next generation of energy professionals having a core grounding in energy justice.



### (3) Engaging with Energy Justice with cost and economic policy-making

This article builds on earlier literature (Heffron *et al.*, 2015) in engaging with how energy justice can engage with cost and economic policy-making. It is important given the primacy in society given to the cost of decision-making and the utilisation of cost-benefit analysis. The account here is critical of how economics currently engages with justice issues and advances the role of justice and it can balance the competing interests of the energy trilemma.

### **Final Thoughts & Future Outlook**

Energy justice has an emerging inter-, cross-, and trans- disciplinary research area, and has achieved notable successes and there is no reason to suggest this cannot continue. Indeed, more so than with environmental justice and climate justice it has inspired scholars from all disciplines to engage with ‘justice’ concerns. By engaging in ‘justice’ concerns researchers have begun to engage in law and policy outcomes and begin to think about how their research can apply in practice, or what is the value of their research to the real world – and engagement with the law and the regulatory process is noted as a challenge for energy justice in the future (Jenkins *et al.*, 2017). In considering this, there is great motivation, as one need only look at the creation of ‘green’ investment funds and the decision of the Norwegian sovereign wealth fund to no longer consider fossil fuel investments as examples where reasoning is needed to ensure decisions such as these have support in research and that they are not just one-off phenomenon. And more interdisciplinary research and education and development in energy justice and development of the concept can achieve just that.

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